

# Claims

- [c1] 1. A method for determining a production plan comprising:
  - creating a constraint which proportionally shares limited resources among competing demands of equal priority; and
  - applying said constraint using a linear program to create a production plan.
- [c2] 2. The method of claim 1, further comprising creating an objective function coefficient which encourages proportional sharing of said limited resources through penalties.
- [c3] 3. The method of claim 1, further comprising creating a constraint and objective function which penalizes the largest percentage of cumulative demand backordered of demand elements in a user specified set.
- [c4] 4. The method of claim 1, wherein said applying process provides proportional sharing across multiple levels of a bill of materials supply chain.
- [c5] 5. The method of claim 1, further comprising classifying said demands into sets based on at least one of demand

family hierarchy and demand priorities.

- [c6] 6. The method of claim 1, wherein said applying process provides proportional sharing that considers multiple demands made on a single resource.
- [c7] 7. The method of claim 1, wherein, if during said allocating process the supply of a resource cannot satisfy a cumulative demand, said resource is allocated proportionally among all demands that contribute to said cumulative demand.
- [c8] 8. A method of allocating resources among competing demands in a linear programming production planning system, said method comprising:
  - classifying said demands into fair share sets, wherein all demands within each fair share set have the same priority;
  - calculating the cumulative demand for each resource within each fair share set; and
  - allocating said resources to said fair share sets in order of fair share set priority,
  - wherein, if during said allocating process the supply of a given resource cannot satisfy a given cumulative demand of a given fair share set, said given resource is allocated proportionally among all demands that contribute to said given cumulative demand within

said given fair share set.

- [c9] 9. The method in claim 8, wherein said process of calculating cumulative demand is time period dependent.
- [c10] 10. The method in claim 8, wherein said classifying process considers demand family hierarchy relationships.
- [c11] 11. The method in claim 8, wherein said allocating process comprises a linear program that simultaneously allocates multiple resources to multiple demands.
- [c12] 12. The method in claim 8, wherein said allocating process encourages proportional sharing by imposing penalties for non-proportional sharing.
- [c13] 13. The method in claim 8, wherein said fair share sets identify parts, priority level, locations, and timing information.
- [c14] 14. The method in claim 1, wherein during said allocating process, higher priority fair share sets are fully satisfied with a resource before lower priority fair share sets receive any of said resource.
- [c15] 15. A program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform a method of allocating resources among competing demands in a linear programming

production planning system, said method comprising:

- classifying said demands into fair share sets, wherein all demands within each fair share set have the same priority;
- calculating the cumulative demand for each resource within each fair share set; and
- allocating said resources to said fair share sets in order of fair share set priority,

wherein, if during said allocating process the supply of a given resource cannot satisfy a given cumulative demand of a given fair share set, said given resource is allocated proportionally among all demands that contribute to said given cumulative demand within said given fair share set.

- [c16] 16. The program storage device in claim 15, wherein said process of calculating cumulative demand is time period dependent.
- [c17] 17. The program storage device in claim 15, wherein said classifying process considers demand family hierarchy relationships.
- [c18] 18. The program storage device in claim 15, wherein said allocating process comprises a linear program that simultaneously allocates multiple resources to multiple demands.

- [c19] 19. The program storage device in claim 15, wherein said allocating process encourages proportional sharing by imposing penalties for non-proportional sharing.
- [c20] 20. The program storage device in claim 15, wherein said fair share sets identify parts, priority level, locations, and timing information.